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Hydrology and Earth System Sciences Discussions



# *Interactive comment on* "The dynamics of cultivation and floods in arable lands of central Argentina" *by* E. F. Viglizzo et al.

**E. F. Viglizzo et al.**

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Comment of REF 1: In section 3.3, the authors compare the relationships existing between the percentage of croplands affected by floods and % of cultivated land over different time window. Honestly, I do not understand the meaning this graph and consequently it doesn’t make any sense to me. Enmienda: In the fourth point of my review there is a typing error. In fact, the authors compare % cultivation during the inter-flooding period (1989-1995) and groundwater levels during the flooding period 1996-2003. They should better explain what is the physical reason behind this graph and why variables like landuse and groundwater level in different instant in time should be correlated.

Reply from Viglizzo E F: I suppose comment refers to Figure 6. The analysis presented



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in Figure 6 was based on our assumption that cultivation during the inter-flooding period (1989-1995) had a significant influence on groundwater level rise. Such assumption relies on arguments from four known review papers: i) Bosh and Hewlett (1982) analyzed the effect of vegetation change on water yield in 94 catchment experiments, ii) Calder (1998) reviewed several studies on water use of forests in relation to other crops in different regions of the world, iii) Zhang, Dawes and Walker (2001) analysed 250 catchments worldwide to find patterns of evapotranspiration in forest, pasture and mixed systems; iv) Andréassian (2004) review the hydrological response of vegetated and de-vegetated catchments in 137 paired watershed experiments. In general they demonstrated that the hydrology of catchments varies markedly in response to different land-use/land-cover configurations, between temperate and tropical regions, and between wet and dry zones. However, a clear conclusion was that reductions in plant cover increase the water yield within the system by decreasing evapotranspiration. These evidences support our assumption that groundwater level rises when grasslands and natural lands in Quinto river highlands are replaced by annual crops, which significantly reduced and shorten the period of annual evapotranspiration during the inter-flooding period. Less evapotranspiration implies that more water is available to subsurface accumulation.

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5, S1973–S1975, 2008

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5, S1973–S1975, 2008

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